

This listing of claims will replace all prior versions, and listings, of claims in the application

LISTING OF CLAIMS

1. (Previously Presented) A front-end circuit for a multi-mode device,

5 comprising:

at least one switch element comprising a multiple switch;

a common antenna;

a first transmission system being an FDD/TDD mixed mode transmission system;

10 a second transmission system being a pure FDD mode transmission system;

a third transmission system being a pure TDD mode transmission system,

15 said third transmission system comprising a transmit path and a receive path; and

a connecting circuit via which a signal path of said first transmission system, a signal path of said second transmission system, said transmit path and said receive path of said third transmission system are connected to said common antenna, said connecting circuit comprising said multiple switch;

20 wherein said multiple switch switches between said signal path of said first transmission system, said signal path of said second transmission system, said transmit path of said third transmission system and said receive path of said third transmission system.

25 2. (Original) The circuit according to claim 1, further comprising:

a diplexer;

wherein a transmission band and a reception band of a transmission system
form a band pair, a frequency difference between band pairs of a first
and of a second transmission system amounts to approximately one
octave, said diplexer being arranged between said common antenna
and said filters for distinguishing between said band pairs.

5

3-4. (Canceled).

5. (Original) The circuit according to claim 1, further comprising a low pass
10 filter as a transmission filter.

6. (Original) The circuit according to claim 1, further comprising a duplexer
for separating a transmission band and a reception band for said FDD mode in said
pure FDD mode transmission system or in said mixed mode transmission system,
15 said duplexer having a band pass filter or a steep-edge low pass filter as a filter for a
transmission path.

7. (Previously Presented) A front-end circuit for a multi-mode communication
terminal device, comprising:

20 at least one switch element selected from the group consisting of RF
switches, duplexers and diplexers;
a common antenna;
a first transmission system being a pure mode transmission system
configured to operate in a pure TDD mode;
25 a second transmission system being a pure mode transmission system
configured to operate in a pure FDD mode;
filters provided for said first and second transmission systems;

a connecting circuit via which individual filters of said filters are connected to said common antenna, said connecting circuit comprising said at least one switch element;

5 said filters comprising a first filter, a second filter, and a third filter, said first filter being a transmit filter of said FDD system, said second filter being a common receive filter for said TDD system and said FDD system, and said third filter being a transmit filter for said TDD system;

a duplexer formed by said first filter and said second filter; and

10 a switch element comprising an RF switch to connect said common antenna with one of said duplexer and said third filter.

8. (Previously Presented) The circuit according to claim 7, further comprising:

15 an RF switch between a common transmission path for said pure FDD mode transmission system and said pure TDD mode transmission system and two transmission filters; and

an RF multiple switch at said antenna for switching between a duplexer for said FDD mode, a transmission filter and a reception filter for said TDD mode;

20 frequency bands of said mixed mode transmission system being clearly spaced from one another.

9. (Original) The circuit according to claim 1, further comprising filters and signal paths for a further transmission system with pure FDD or pure TDD mode in addition to said transmission system with mixed FDD/TDD mode and said

25 transmission system with pure FDD or TDD mode.

10. (Original) The circuit according to claim 9, further comprising:

an RF switch at an antenna side of said circuit for a TDD system; and
a duplexer for each FDD system.

11. (Original) The circuit according to claim 10, further comprising:

5 a diplexer; and
components for a further mixed transmission system in addition to said mixed
and said two pure systems, at least one mixed transmission system
being separated from other transmission systems at said antenna side
by said diplexer.

10

12. (Original) The circuit according to claim 1, wherein said switches are
fashioned as GaAs FET transistors.

13. (Original) The circuit according to claim 1, wherein said switches are
15 realized with PIN diodes having additional phase shifters.

14. (Previously Presented) The circuit according to claim 1, wherein said at
least one switch is formed as a component comprising at least one of a component
selected from the group consisting of GaAs FET transistor and a PIN diode having
20 additional phase shifters, wherein at least one of said pure-mode filters or said
mixed-mode filters is realized as an independent component, comprising at least
one filter selected from the group consisting of a SAW filter, an MWK filter, an
FBAR filter, a strip-line filter, and an LC filter .

25 15. (Original) The circuit according to claim 1, wherein individual components
of the circuit are arranged in a discrete manner on a common printed circuit board.

16. (Original) The circuit according to claim 1 wherein at least a part of discrete components of said circuit is integrated in a common substrate.

17. (Original) The circuit according to claim 16, wherein all individual 5 components together with a DC drive are integrated in a common substrate that is realized in a multi-layer technique with partially planar structures.

18. (Previously Presented) The circuit according to claim 1, further comprising a directional coupler for regulating power of a power amplifier as part of 10 a detector of at least one transmission input.

19. (Previously Presented) The circuit according to claim 1, further comprising a protective element that protects a transmission amplifier against feedback or reflected power and is selected from a group consisting of an insulator 15 and a circulator, and is arranged between a transmission amplifier and a transmission filter.

20-22. (Canceled).

20 23. (Original) The circuit according to claim 22, further comprising an RF switch between a common transmission path for said pure FDD mode transmission system and said pure TDD mode transmission system and two transmission filters.

24-27. (Canceled).

25

28. (Previously Presented) The circuit of claim 7, wherein frequency bands of said first and second transmission systems are overlapping or adjacent to each other.

5 29. (Previously Presented) The circuit according to claim 1, wherein said switch is a duplexer, wherein said duplexer is realized as an independent component and comprises at least one filter selected from the group consisting of a SAW filter, an MWK filter, an FBAR filter, a strip-line filter, and an LC-filter.

10 30. (Previously Presented) The circuit according to claim 7, further comprising:

 a common transmit path for said TDD system and said FDD system; and
 a further RF switch to connect said common transmit path with one of said second filter and said third filter.

15 31. (Previously Presented) A front-end circuit for at least one of a multi-band and a multi-mode device, comprising:

 a common antenna;
 a multiple switch connected to said common antenna;
20 a first transmission system comprising a transmit path and a receive path, said first transmission system being configured to operate in one of a pure TDD mode and a mixed TDD/FDD mode; and
 a second transmission system;
 wherein said multiple switch switches between said transmit path, said receive path of said first transmission system and said second transmission system.

32. (Previously Presented) The circuit according to claim 31, wherein:
said second transmission system comprises a transmit path and a receive
path, said second transmission system operating in one of a pure TDD
mode and a mixed TDD/FDD mode; and
5 said multiple switch additionally switches between said receive path and said
transmit path of the second transmission system.

33. (Previously Presented) The circuit according to claim 31, wherein:
10 said second transmission system comprises a transmit filter and a receive
filter;
said second transmission system operates in a pure FDD mode; and
said transmit filter and said receive filter of said second transmission system
form a duplexer.
15

34. (Previously Presented) The circuit according to claim 31, wherein:
a transmit filter is arranged in said transmit path of said first transmission
system; and
20 a receive filter is arranged in said receive path of said first transmission
system;
said receive filter of the first transmission system is a band-pass filter; and
said transmit filter of the first transmission system is one of a band-pass filter
and a low-pass filter.
25

35. (Previously Presented) The circuit according to claim 33, further
comprising:

a further switch to switch between said transmit path of said first transmission system and a transmit path of said second transmission system; wherein said duplexer is arranged between said multiple switch and said further switch.

5

36. (New) The front-end circuit according to claim 1, wherein frequency bands of the mixed mode and the pure mode systems are overlapping or adjacent to each other.

10